



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,733	07/30/2003	Hiraku Chakihara	501.42869X00	7533

20457 7590 12/28/2004

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-9889

EXAMINER

ABRAHAM, FETSUM

ART UNIT	PAPER NUMBER
----------	--------------

2826

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/629,733

Applicant(s)

CHAKIHARA ET AL.

Examiner

Fetsum Abraham

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23,30-47 and 51-55 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-23,38-46 and 51-55 is/are allowed.
- 6) ☒ Claim(s) 30 and 32-37 is/are rejected.
- 7) ☒ Claim(s) 31 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action: The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 30,47 are rejected under 35 U.S.C. 102(a) as being anticipated by Moniwa et al (U.S application 10/465,550).

The patent application discloses a memory structure in figure 3 comprising first and second drive MISFETs (DR1,DR2) on the major surface of a substrate and first and second vertical MISFETs having gate electrodes (54) formed over the drive MISFETs and over the metal sheet (46) that is separated from drive MISFETs by an insulation layer (38).

As for claim 47, the claimed structure is a duplicate of the prior art figure 3.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the same document.

Although the prior art may not have detailed the type of metal applicable in the art, it would have been obvious to one skilled in the art to utilize tungsten whether in singularity or in multiple layered structure for its high melting point characteristic, since

is it commonly used in the art and since the prior art does not discriminate it from the "metal" layer used in the structure, indicating that the most common and known metals in the art are applicable for the structure.

As for the cross connection of the specific elements of the claimed structure, memory cells are commonly interwired as such.

As for claims 33,34 the most convenient interconnection portion of the vertical gate structure with the drain of the drive FET element would be at the lower end since that portion is the closest to the drain of the driving FET. Further, the drain electrode of the driving FET is in electrical contact with the gate of the vertical FET as can be seen in figure 3 at least capacitively for a given cell. Please note that any driving FET in a given array of cells must have the drain connected to the gate of what it is driving, in this case the vertical transistors. This interconnection is generic to all memory cells including the prior art.

As for claims 35,36,37 vertical gates including those in the prior art are shaped like sidewalls since they are elongated vertically sandwiching the active layers when formed in multiplicity in self aligned manner as is in all memory structures.

Claim 31 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1-23,38-46,51-55 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fetsum Abraham whose telephone number is: 571-272-

Art Unit: 2826

1911. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915.



Felson Abraham

12/17/04